

REMARKS

Claims 1-6, 8-28, 54-59 and 61-82 were previously pending. Claims 4 and 57 have been amended. Claims 83-94 have been added. Accordingly, claims 1-6, 8-28, 54-59 and 61-94 are pending. Applicants appreciate the Examiner's acknowledgement that claims 9-20, 62-73, and 78-82 contain allowable subject matter. Reconsideration and withdrawal of all outstanding rejections and objections are respectfully requested in light of the foregoing amendments and the following remarks.

Claims 4 and 57 stand rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Claims 4 and 57 have been amended to delete the phrase "the other portions of the implant" to obviate the rejection. Withdrawal of the rejection is therefore requested.

Claims 1, 2, 4, 5, 21-25, and 27 stand rejected under 35 USC 102(e) as being anticipated by US Patent Pub No. 2004/0046193 by Park et al ("Park"). Moreover, claims 3, 6, 8, 26, and 28 stand rejected under 35 USC 103(a) as being unpatentable over Park. The rejections are traversed and reconsideration requested.

Park does not anticipate or render obvious the claimed invention because Park does not teach or suggest the unique combination of elements recited by independent claims 1, 54, or newly added, independent claim 83. Specifically, independent claims 1 and 54 each recite, *inter alia*, a photosensor having "an implant region," wherein the implant region has "a first portion. . . [that] extends further towards a region of said substrate beneath [a] gate than a second portion of said implant region. . . wherein said second portion is . . . substantially underneath said upper first portion such that [a] lower boundary of said first portion forms an upper boundary for at least a part of said second portion."

Unlike the claimed invention, Park shows in FIG.5 "a diode region" that includes an n-type charge collection region 58 and a p-type surface region 60. Next to the diode region, Park shows "an active region," that includes "an n-type channel region 62" beneath a gate structure 64. FIG 5; col. 3, [0026]. The channel region 62 is part of a transistor formed in connection

with the gate structure 64 and is not part of a photosensor, as suggested by the Office Action. Park does not teach or suggest a photosensor having an implant region that is comprised of more than one portion, including “a first portion. . .[that] extends further towards a region of said substrate beneath [a] gate than a second portion of said implant region.”

For at least these reasons, Park does not anticipate or render obvious the claimed invention as embodied by independent claims 1 or 54. Claims 2-6, 8-28, 55-59, 61, and 74-77 each depend, either directly or indirectly, from one of claims 1 or 54 and are allowable for at least these reasons. Accordingly, withdrawal of the rejection of claims 1, 2, 4, 5, 21-25, 27, 3, 6, 8, 26, and 28 is respectfully requested.

Claims 54-59, 61, and 74-77 stand rejected under 35 USC 103(a) as being unpatentable over Park in view of U.S. Patent No. 6,407,417 to Nagata et al. (“Nagata”). The Office Action also refers to a “Nakamura” reference, although it is not clear what, if any, reliance the Office Action places on the teachings of Nakamura. The rejection is traversed and reconsideration requested.

For at least the reasons given above, Park does not anticipate or render obvious the claimed invention as embodied by independent claim 54. Specifically, Park does not teach or suggest a photodiode having “an implant region,” wherein the implant region has “a first portion. . . which extends further towards a region of said substrate beneath [a] gate than a second portion of said implant region. . . wherein said second portion is substantially underneath said first portion such that [a] lower boundary of said first portion forms an upper boundary for said second portion.” Nor do either of the other cited references, whether considered alone or in combination, cure the deficiencies of Park. Moreover, claims 55-59, 61, and 74-77 each depend from claim 54 and are also allowable for at least these reasons.

In addition, new independent claim 83 relates to an image pixel structure comprising, *inter alia*, “a photosensor formed in a semiconductor substrate,” that includes first, second, and third angled implant regions, each “being formed by implanting second conductivity type ions into said substrate,” at respective first, second, and third angles and energy levels, “wherein said first, second and third angles are within the range of about 0 to about 30 degrees

from normal and at least one of said angles is greater than 0 degrees, and wherein at least one of said first, second, or third energy levels is not equal to the other two energy levels." This unique combination of elements is not taught or suggested by any of the cited references, whether considered alone or in combination. Accordingly, new claim 83, and claims 84-94 dependent therefrom, are submitted to be allowable.

In view of the above amendment, applicant believes the pending application is in condition for allowance. Favorable action on claims 1-6, 8-28, 54-59 and 61-94 is solicited.

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